

November 9, 2001

MEMORANDUM TO: Melvyn Leach, Chief  
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SUBJECT: DIFFERING PROFESSIONAL VIEW ON COMMISSION PAPER TITLED:  
APPLICABILITY OF SECTION 11e.(2) OF THE ATOMIC ENERGY ACT  
TO MATERIAL AT THE SEQUOYAH FUELS CORPORATION URANIUM  
CONVERSION FACILITY"

Please find attached our Differing Professional View (DPV) on the subject Commission Paper. We request that the DPV be attached to the Commission Paper.

Attachment: DPV

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"APPLICABILITY OF SECTION 11e.(2) OF THE ATOMIC ENERGY  
ACT TO MATERIAL AT THE SEQUOYAH FUELS CORPORATION  
URANIUM CONVERSION FACILITY"

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We have reviewed the Commission Paper that this Differing Professional View is attached to and disagree with its recommendation. Furthermore, we believe that the Commission Paper does not adequately discuss the complex issues involved in reaching its recommendation. We recognize that the safety significance of the decision on whether to treat the Sequoyah facility wastes as byproduct material as defined in sec. 11e.(2) of Atomic Energy Act of 1954, as amended (AEA) or as source material waste, are minimal. The significance of the decision relates more to whether we adhere to legislation and regulations and follow them appropriately, even if that sometimes creates problems in the short term. We believe that arbitrarily reinterpreting fundamental definitions will, in the long term, create more problems.

**Can the material reasonably be considered to be 11e.(2) byproduct material?**

The first issue that must be addressed is whether the material at the Sequoyah Fuels Corporation (SFC) facility can reasonably be considered to be 11e.(2) byproduct material. We will address three aspects of this issue: 1) how well does the material fit the definition of 11e.(2) byproduct material, 2) how does it comport with the intent of Congress when it enacted the Uranium Mill Tailings Radiation Control Act of 1978, as amended (UMTRCA), and 3) how do the radiological characteristics of the material compare with typical 11e.(2) byproduct material.

Definition of 11e.(2) byproduct material

The definition of byproduct material in section 11e.(2) of the AEA is "the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." There is no argument that the material in question at Sequoyah is waste. However, two questions that need to be considered are whether the waste was produced by the "extraction or concentration" of uranium and whether the material that was processed at Sequoyah was an "ore."

The material that was processed at Sequoyah was an impure form of yellow cake, with the product of the processing being a purer form of yellow cake. The licensee argues that the process is "concentration" of the yellow cake (and thus of the uranium), is similar to what is done

at a uranium mill, and thus meets that aspect of the definition in AEA sec 11e.(2). We would argue that one can differentiate between “concentration” and “purification.” The concentration of yellow cake at a uranium mill is an integral component of a continuous process that starts with uranium ore and ends with uranium product. That product, the yellow cake, is the source material that the ore was processed for. The purpose of a uranium mill is to extract and concentrate uranium found in ore and produce a useful uranium product. On the other hand, one can contemplate examples in which material containing a significant percentage of uranium is purified or converted into another material (e.g., another chemical form) with a higher percentage of uranium. Are wastes from such a process to be considered 11e.(2) byproduct material because the uranium has been slightly “concentrated?” The licensee’s argument, that the purification of yellow cake at Sequoyah is the “concentration” contemplated in the definition of 11e.(2) byproduct material, is not obvious and, if accepted, could be used at other fuel cycle facilities that concentrate uranium.

The licensee also argues that the impure yellow cake processed at the Sequoyah facility can be considered to be “ore” in the context of the definition in AEA section 11e.(2), but that argument does not withstand scrutiny. While neither the AEA nor NRC regulations define the term “ore,” and it thus could be broadly construed, its meaning is not unlimited in scope and should be properly constrained. “Ore,” in the context of the AEA, has been used to refer to material which is the source of the uranium and/or thorium that is, or can be, used to produce special nuclear material. The historical view has been that its meaning should be confined to material from which natural uranium and/or thorium is initially extracted or concentrated, at a uranium or thorium mill during the milling process. Under this view, “ore” would not include uranium or “yellow cake” that has already been extracted from the “ore” even if it was further refined (i.e., concentrated and purified). It follows under this view that the term “ore” should be limited to natural ores and other materials, such as alternate feed material, that are traditionally used in the milling process to obtain uranium and thorium for eventual production of special nuclear material.

Furthermore, in a *Federal Register* notice on May 13, 1992 (57 FR 20525) staff proposed a definition of the term “ore” to be applied in the definition in AEA section 11e.(2). The definition proposed was: “ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill.” Although the definition has not been codified in NRC regulations,<sup>1</sup> it has been reviewed and approved by the Commission on several occasions since then and has remained unchanged. The intent of the definition was to allow tailings and wastes from processing of alternate feed material at a licensed mill to meet the 11e.(2) byproduct material definition so that it could be disposed of in the mill’s tailings pile. However, the Commission purposely put constraints in the definition, primarily by limiting it to alternate feed material processed in a “licensed uranium or thorium mill,” to limit its use. The yellow cake processed at the Sequoyah facility would not meet the ore definition, as the facility is not a licensed uranium mill.

The Commission Paper also proposes a different way to resolve the “ore” problem. It proposes to consider the Sequoyah facility to be a continuation of the milling started at a facility licensed as a

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<sup>1</sup> The Commission directed the staff to put the definition in NRC regulations. On several occasions the staff initiated efforts to do that, but for various reasons, never completed the effort.

mill. Under this view, the ore would be the original ore brought to the mill that supplied the yellow cake to the Sequoyah facility. The difficulty with this view is similar to that identified above in the discussion on concentration. That is, any process at any nuclear fuel cycle facility that results in an increase in the concentration of uranium (or thorium) would have its wastes qualify as 11e.(2) byproduct material, as the uranium would have started out as ore at some uranium mill.

In sum, a plain reading of the definition in sec. 11e.(2) of the AEA would lead one to conclude that the wastes at the Sequoyah facility do not meet that definition. Recognizing that the agency has some latitude in interpreting the AEA and its regulations, it may be helpful to consider the intent of Congress in creating the definition in sec.11e.(2) of the AEA.

#### Intent of UMTRCA

The AEA was amended by UMTRCA to include a second definition of byproduct material [sec. 11e.(2)]. The reason for this addition of radioactive material brought under NRC regulatory authority is discussed Sec. 2.(a), which states “The Congress finds that uranium mill tailings at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health...require...the stabilization, disposal,, and control...of such tailings in order to prevent or minimize radon diffusion into the environment...”

Prior to the enactment of UMTRCA, uranium mill tailings were not regulated under the AEA because the tailings usually contained less than 0.05 percent uranium and thorium and thus were exempt, under 10 CFR 40.13(a), as unimportant quantities of source material. Uranium mill tailings did contain sufficient quantities of radium, left from the processing of the uranium ore, to present a potential radiological hazard, including that of radon release, if they were not properly stabilized and controlled. UMTRCA was enacted to close a regulatory gap by creating the legislative framework to control the radiological hazard of previously unregulated radioactive material.

In contrast to uranium mill tailings, the wastes at the Sequoyah facility were always under NRC regulatory authority as source material. UMTRCA did not provide additional protection to the public with respect to the Sequoyah facility wastes nor to source material wastes at other NRC regulated facilities. There is no evidence that Congress sought to include such material, that was already under NRC regulatory jurisdiction, in the definition in AEA sec. 11e.(2).

#### Radiological characteristics of Sequoyah waste

It is interesting to consider the radiological characteristics of the Sequoyah facility wastes and compare them to typical uranium mill tailings. In its January 2001 request, SFC included a table (Table 2, p. 46) listing concentrations of various constituents in the Sequoyah waste and in mill tailings at inactive (i.e., UMTRCA Title I) mill sites and in soils. The table below contains radiological information for the wastes at the Sequoyah facility and for Title I tailings, extracted from the SFC table, and similar information for a “model mill” described in NRC’s Final Generic Environmental Impact Statement on Uranium Milling, NUREG-0706, 1980.

Radiological constituent concentrations in SFC wastes and U mill tailings

Constituent (pCi/g)	Sequoyah Raffinate Sludge <sup>a</sup>	Title I mill tailings <sup>b</sup>	NRC "model mill" tailings <sup>c</sup>
Uranium	2500 - 19,200 avg - 8990	38 - 380	39
Th-230	2930 - 48,200 avg - 23,030	340 - 1000	280
Ra-226	<14 - 190 avg - 118	340 - 1000	280

a SFC January 5, 2001 submittal; p.46.

b FEIS for Remedial Action Standards for Inactive Uranium Processing Sites (40CFR192), EPA, 1982.

c Final Generic EIS on Uranium Milling, NUREG-0706, 1980.

It is evident from the table that the Sequoyah facility wastes are very different, radiologically, from uranium mill tailings. Uranium and thorium concentrations are two orders of magnitude higher for the Sequoyah wastes, and present an increased radiological risk, while radium concentrations are less than half that typical of uranium mill tailings. For the Sequoyah facility wastes, the primary radiological concern would be the uranium and thorium content, rather than radon diffusion into the environment, as stated in sec. 2.(a) of UMTRCA.

In summary, the wastes at the Sequoyah facility 1) do not appear to meet a plain reading of the definition found in sec. 11e.(2) of the AEA, 2) do not appear to be the type of material Congress intended to include in the definition, and 3) are not similar to typical uranium mill tailings in radiological characteristics. At best, the basis for considering the material to be 11e.(2) byproduct material is weak. In our opinion the basis is flawed and will not withstand scrutiny by an impartial judge. However, even if we assume that there is sufficient basis to consider the material to be 11e.(2) byproduct material, there are several other issues to consider

### **Does this provide an easier path to remediating the site?**

The Commission Paper recommends that the Sequoyah facility waste be classified as 11e.(2) byproduct material because it would "result in a well tested and defined process for decommissioning the site..." However, we see potential pitfalls in this approach that could result in further delays in decommissioning the site, including the possibility of the 11e.(2) classification being overturned.

As discussed above, the basis for classifying the Sequoyah facility wastes as 11e.(2) byproduct material is, at best, weak. If the Commission makes the decision that the wastes are 11e.(2) byproduct material, the issue is closed within NRC and to stakeholders - unless it is challenged in Federal Appeals Court. However, if it is challenged in Federal Appeals Court, the weak basis for classifying the Sequoyah facility wastes as 11e.(2) byproduct material will be examined in detail by an impartial judiciary. The issues and arguments raised in the first section of this paper, along with perhaps other issues identified by the parties, will be argued, reviewed, and debated. This process can take a considerable amount of time. If, at the end of the process, it is decided that

the Sequoyah facility wastes are not 11e.(2) byproduct material, the decommissioning process will have to start over again.

Additionally, as the Commission Paper points out, even accepting the licensee's argument concerning the classification of the wastes at the Sequoyah facility, a significant amount of waste would still not be classified as 11e.(2) byproduct material. In its January 5, 2001 submittal, SFC states that almost a quarter of the waste (23 percent, which amounts to almost 2 million cubic feet) could not be classified as 11e.(2) byproduct material. This material would have to be disposed of, either with the 11e.(2) byproduct material as non-11e.(2) byproduct material, or in a separate cell. For the material to be disposed of as non-11e.(2) byproduct material, the recently updated "Interim Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments" would be followed. The Commission Paper states that approval from the State of Oklahoma, the Central Compact, and the Department of Energy (DOE) would be needed, in addition to NRC approval. It is not clear that such approvals would be readily obtained. Additionally, the argument in the Commission Paper that the recommended approach would "result in a well tested and defined process for decommissioning the site..." is predicated on the assumption that SFC receives the approvals for the non-11e.(2) component of the waste. However, the non-11e.(2) process is not well tested or defined; indeed the industry has complained on several occasions about the difficulty of process. Thus, even if NRC agrees to classifying some of the Sequoyah facility wastes as 11e.(2) byproduct material, decommissioning the site may be frustrated by the inability to get the necessary approvals for the non-11e.(2) component of the waste.

The other option identified in the Commission Paper for the non-11e.(2) component of the waste, is to dispose of it in a separate cell at the site, under the License Termination Rule (LTR). However, this would bring us back to the problem that classifying some of the waste as 11e.(2) byproduct material was designed to resolve; i.e., obtaining an institutional control custodian.

In summary, even if some of the waste material at the Sequoyah facility could be reasonably considered to be 11e.(2) byproduct material, it is problematic whether reclassifying it as such would result in a more expedient path to site decommissioning.

### **Unanticipated consequences of "novel" interpretation of 11e.(2)**

In addition to the concerns identified above, another potential problem is that reclassifying the Sequoyah wastes as 11e.(2) may have unanticipated consequences, both with respect to the Sequoyah facility and to other facilities subject to NRC regulation. An example of unanticipated consequences resulting from reinterpretations of what is, and what is not, 11e.(2) byproduct material may be instructive.

Recently, the staff revised its interpretation of 11e.(2) byproduct material. It concluded that material that met the definition in sec. 11e.(2) of the AEA (i.e., material that was tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content) was not 11e.(2) byproduct material if it was not under NRC (or Agreement State) license at the time of, or after, the enactment of UMTRCA. The intent of the revised interpretation was to preclude NRC from having to regulate the U.S. Army Corps of Engineers (ACE) as it worked at remediating sites under the Formerly Utilized Sites Remedial

Action Program (FUSRAP). Much of the radioactive material at FUSRAP sites met the definition in AEA sec. 11e.(2). Before being transferred to ACE, remediation activities at FUSRAP sites had previously been performed by DOE, which is not a "person" subject to NRC regulation under the AEA and thus neither the material nor the DOE activities were licensed by NRC at most of the FUSRAP sites. The reinterpretation of 11e.(2) byproduct material solved the immediate problem of regulating ACE activities at FUSRAP sites. However, it was not recognized, until late in the process, that material from FUSRAP sites had been sent by DOE to an NRC licensed site for disposal as 11e.(2) byproduct material. Under the revised interpretation, that site now has a mixture of 11e.(2) byproduct material and similar radioactive material not regulated under the AEA, along with material that may be regulated under the Resource Conservation and Recovery Act, in its 11e.(2) byproduct material cell. The long-term ramifications of that situation have not yet been resolved.

The change in interpretation of AEA sec. 11e.(2) recommended in the Commission Paper is a significant departure from past practice by the agency. As such, it may affect other licensees or facilities in ways not currently anticipated. For example, are there other facilities that could, under the recommended revised interpretation, reclassify some wastes as 11e.(2) byproduct material? Could the proposed reclassification have the effect of bringing some wastes that have not been regulated by NRC, such as from side stream recovery operations at phosphate facilities, under NRC authority? Any time we reinterpret legislation and regulations and reverse years of agency practice, we run the risk of unanticipated consequences.

### **The problem is with decommissioning process**

The underlying reason for the proposal to reclassify some Sequoyah facility wastes as 11e.(2) byproduct material is that the decommissioning process applicable to the facility has implementation problems. It appears to us that the solution should be to remedy those problems, rather than try to force the Sequoyah facility wastes into the mill tailings program.

As we understand it, the major problem confronting SFC under the decommissioning regulations in 10 CFR 20.1403 is the need to identify a long-term custodian. DOE apparently is reluctant to accept the role as custodian for the site, even though it could do so under current legislation. Perhaps a reinterpretation of the requirements in §20.1403 rather than the definition in AEA sec. 11e.(2) may be possible. Perhaps a request from the highest levels in NRC to DOE would help. Perhaps a request to Congress, to enact legislation requiring DOE to take such sites, is needed. The solution to problems related to implementing the requirements in §20.1403 should begin there, rather than in reinterpreting the definition in AEA sec. 11e.(2), with all the potential problems that could create.

### **Performance goals**

We have also analyzed the two options presented in the Commission Paper (continue decommissioning the site under the requirements in the LTR, and reclassify some of the wastes as 11e.(2) byproduct material) with respect to the performance goals identified in the NRC Strategic Plan.

Maintain safety, protection of the environment, and the common defense and security

Decommissioning the Sequoyah site under the requirements in either 10 CFR 20.1403 (option 1) or 10 CFR Part 40, Appendix A (option 2) would meet this goal. A major argument to reclassify some of the wastes as 11e.(2) byproduct material is that it would be more likely to lead to actual site decommissioning than it would be if the current process were continued. However, as shown above, that argument is highly problematical. We conclude that neither option is more likely to lead to achievement of this goal.

#### Increase public confidence

To reach this goal, the NRC must be viewed as an independent, open, efficient, clear and reliable regulator. It can be argued that reclassifying the Sequoyah wastes as 11e.(2) byproduct material, primarily because the licensee sees that as a more expedient path to decommissioning, will not increase public confidence. As discussed in the Commission Paper, in 1993 SFC made an argument that some of the wastes could be considered to be 11e.(2) byproduct material. In a July 6, 1993 Memorandum to the Commission, the Executive Director of Operations wrote "The uranium contaminated decommissioning wastes at Sequoyah Fuels do not fit the definition of 11e.(2) byproduct material..." The Commission Paper does not present a strong argument to revise that conclusion, other than the perception that it may be more expedient. In 1997, NRC promulgated the LTR to address decommissioning at sites like Sequoyah. However, because of problems with the LTR, SFC is once again asking NRC to reclassify some of the wastes as 11e.(2) byproduct material. Agreeing to the reclassification will not make NRC look independent, efficient, or reliable. We conclude that option 1 will enhance achievement of this goal, while option 2 will be detrimental to this goal.

#### Make the NRC activities and decisions more effective, efficient, and realistic

The Strategic Plan states "In working toward this performance goal, the NRC will apply its Principles of Good Regulation, which include efficiency, clarity, and reliability." The primary justification for option 2 is that the current regulatory framework for decommissioning the Sequoyah facility, §20.1403, is proving difficult to implement. It appears to us that improving the regulatory framework of §20.1403 would be the appropriate way of achieving this goal. Reclassifying material because of implementation problems with the regulatory framework under which it has always been regulated, does not appear to us to be a sign of reliable regulation. We conclude that option 2 will be detrimental to this goal.

#### Reduce unnecessary regulatory burden on stakeholders

Decommissioning the Sequoyah site under the requirements in either 10 CFR 20.1403 or 10 CFR Part 40, Appendix A imposes a regulatory burden on SFC. The argument for option 2 could be construed as an argument that doing so would reduce the regulatory burden on SFC. However, as shown above, that argument is highly problematical. Furthermore, another stakeholder, the State of Oklahoma, has initiated a hearing on SFC's proposed decommissioning plan. The Commission Paper states that if option 2 is approved, the current decommissioning plan would require significant changes. If Oklahoma (or another stakeholder) identifies concerns with the revised decommissioning plan, it would have to initiate another hearing to address those concerns. The regulatory burden on stakeholders other than SFC could therefore be increased under option 2. We conclude that option 2 could be detrimental to this goal.



## **Conclusion**

For all the reasons identified and discussed above, we conclude that the wastes at the Sequoyah facility should not be reclassified as 11e.(2) byproduct material, i.e., that option 1 should be chosen.